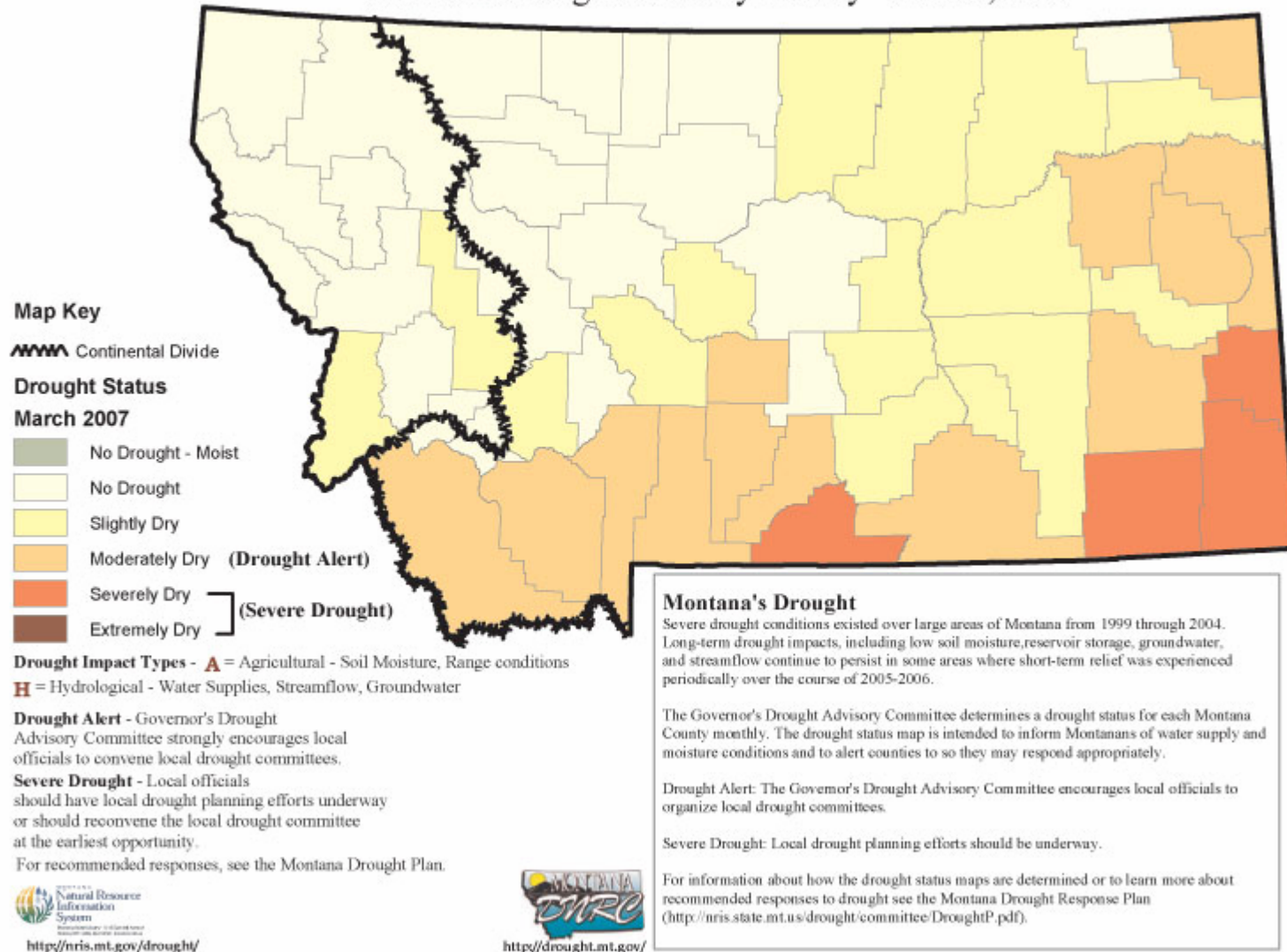


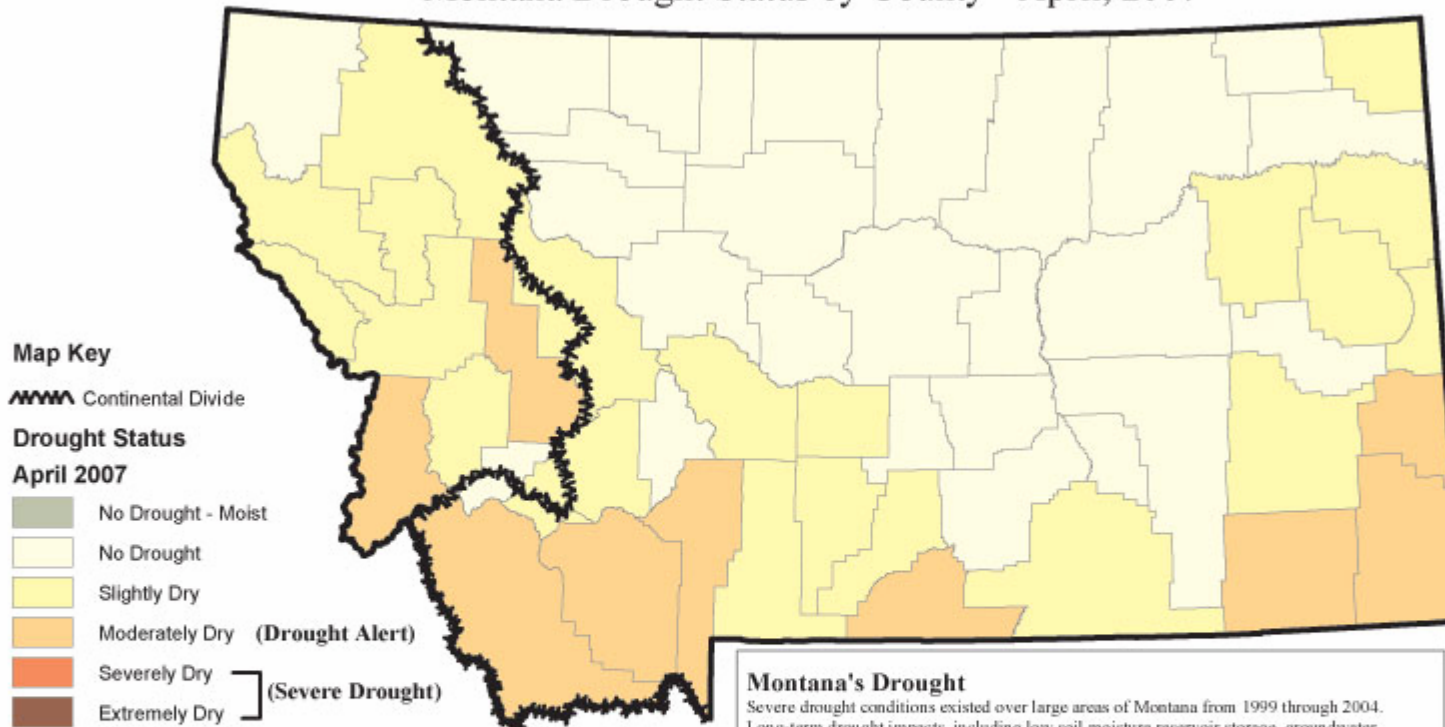
# Montana Drought Status - March

Montana Drought Status by County - March, 2007



# Montana Drought Status - April

Montana Drought Status by County - April, 2007



**Drought Impact Types** - **A** = Agricultural - Soil Moisture, Range conditions

**H** = Hydrological - Water Supplies, Streamflow, Groundwater

**Drought Alert** - Governor's Drought

Advisory Committee strongly encourages local officials to convene local drought committees.

**Severe Drought** - Local officials

should have local drought planning efforts underway or should reconvene the local drought committee at the earliest opportunity.

For recommended responses, see the Montana Drought Plan.



<http://nris.mt.gov/drought/>



<http://drought.mt.gov/>

## Montana's Drought

Severe drought conditions existed over large areas of Montana from 1999 through 2004. Long-term drought impacts, including low soil moisture, reservoir storage, groundwater, and streamflow continue to persist in some areas where short-term relief was experienced periodically over the course of 2005-2006.

The Governor's Drought Advisory Committee determines a drought status for each Montana County monthly. The drought status map is intended to inform Montanans of water supply and moisture conditions and to alert counties to so they may respond appropriately.

**Drought Alert:** The Governor's Drought Advisory Committee encourages local officials to organize local drought committees.

**Severe Drought:** Local drought planning efforts should be underway.

For information about how the drought status maps are determined or to learn more about recommended responses to drought see the Montana Drought Response Plan (<http://nris.state.mt.us/drought/committee/DroughtP.pdf>).



# **Governor's Drought Advisory Committee Meeting**

**April 19, 2007**

**National Weather Service**

**Gina Loss**

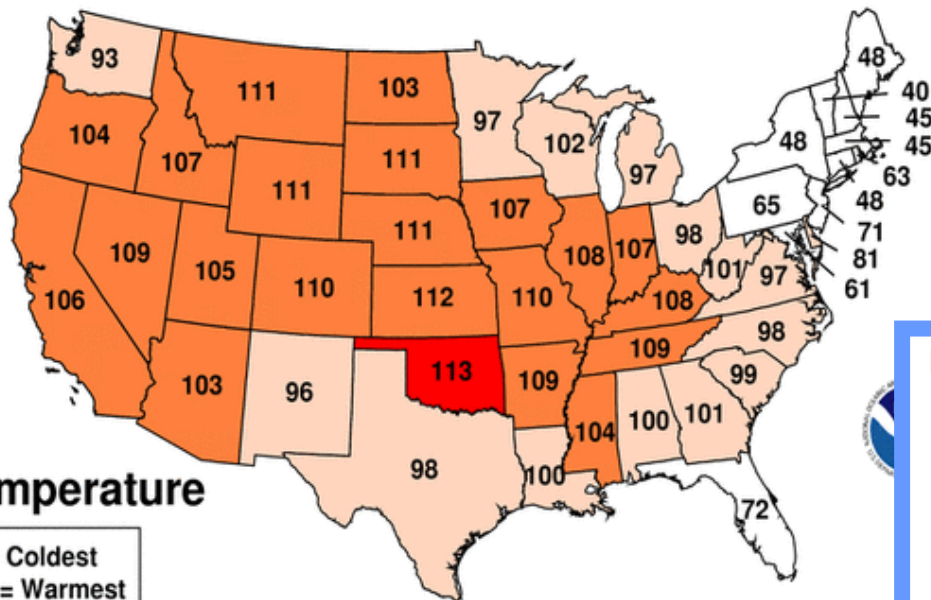
# Temperature Rankings

## Averaged Across Entire State

3<sup>rd</sup> warmest

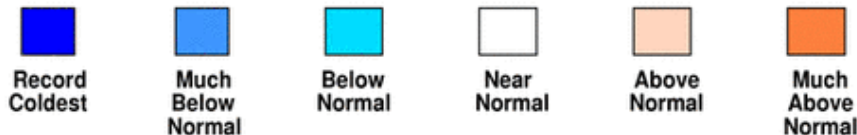
### March 2007 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA



#### Temperature

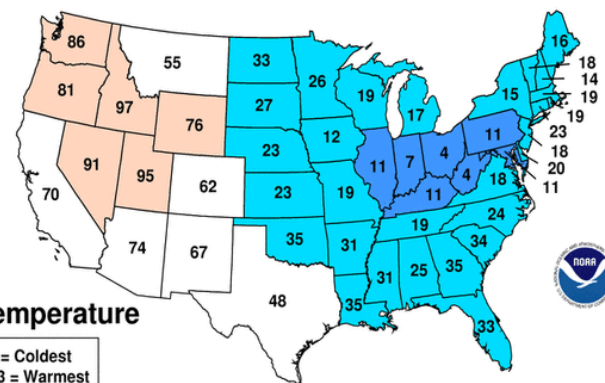
1 = Coldest  
113 = Warmest



Near normal

### February 2007 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA



#### Temperature

1 = Coldest  
113 = Warmest





## Near normal

## National Climatic Data Center/NESDIS/NOAA



1 = Driest  
113 = Wettest

**Record  
Driest**

 Much Below Normal

**Below  
Normal**

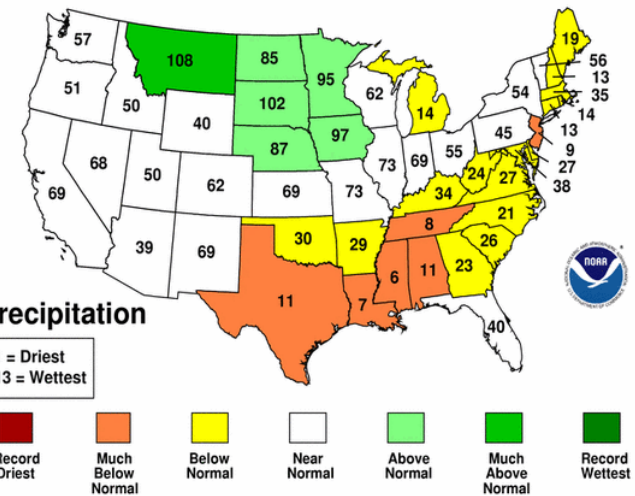
**Near Normal**

**Above  
Normal**

**Much Above Normal**

## 6<sup>th</sup> wettest

## National Climatic Data Center/NESDIS/NOAA



### Precipitation

1 = Driest  
113 = Wettest

**Record  
Driest**

 Much Below Normal

 Below Normal

**Near  
Normal**

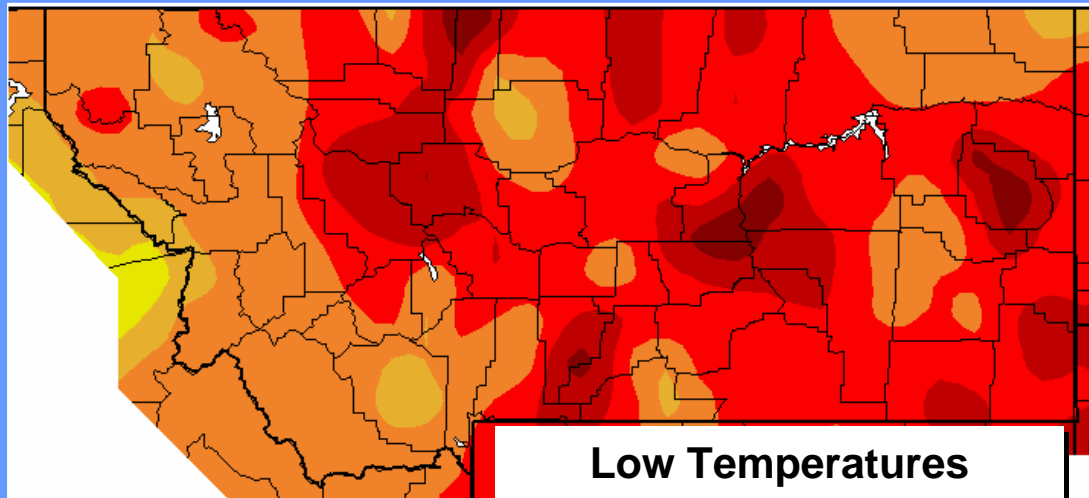
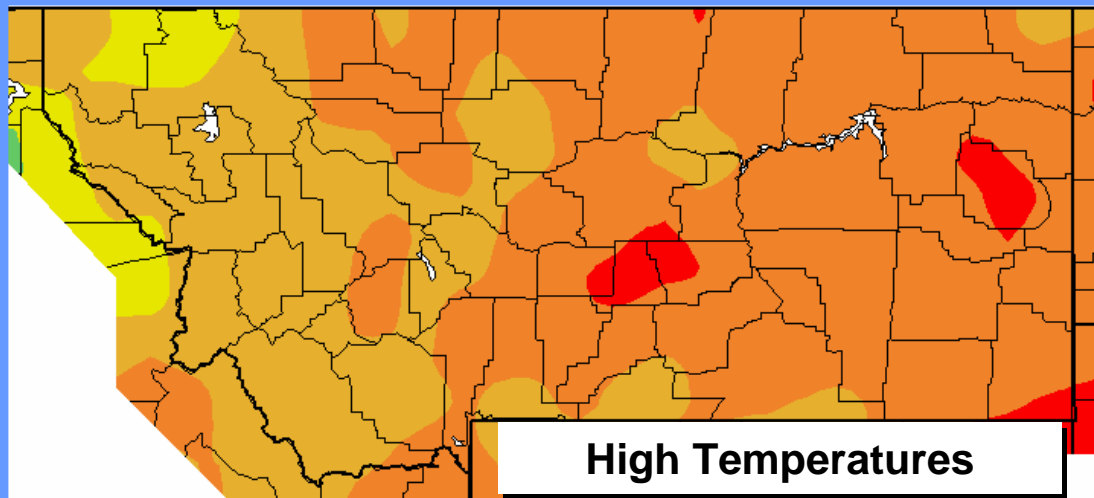
**Above  
Normal**

**Much Above Normal**

**Record Wetttest**

# Temperature Anomalies

March 2007



💧 Temperatures averaged near normal

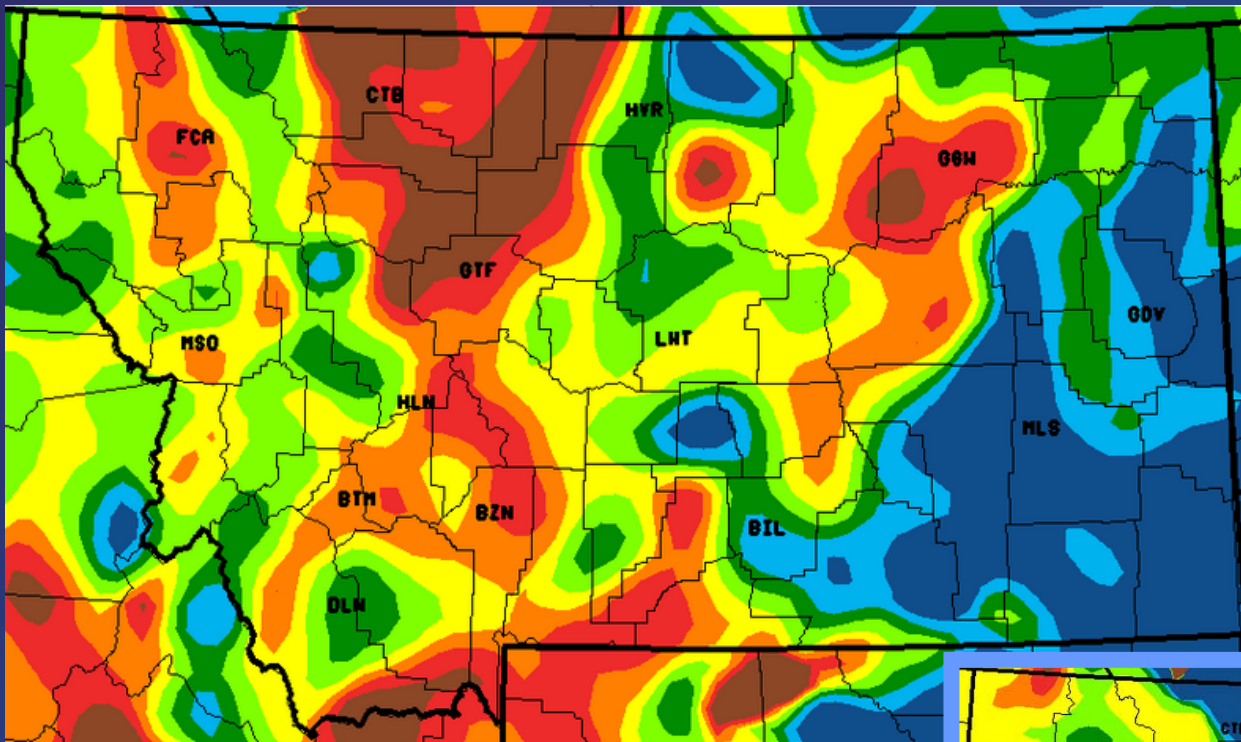
💧 **Highs**

- *West and southwest mostly 4 to 8 degrees above normal*
- *East of divide mostly 8 to 12 degrees above normal*

💧 **Lows**

- *West of divide – 4 to 6 degrees above normal*
- *East of divide – 4 to 10 degrees above normal*

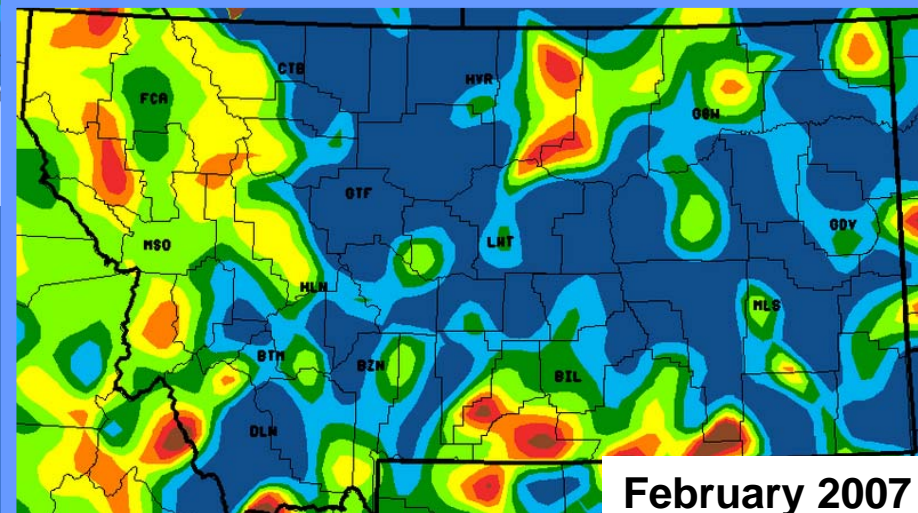
# Percent of Normal Precipitation March 2007



March 2007 Percent of Normal Precipitation  
Period of Normal: 1971-2000

20 40 60 85 115 150 200

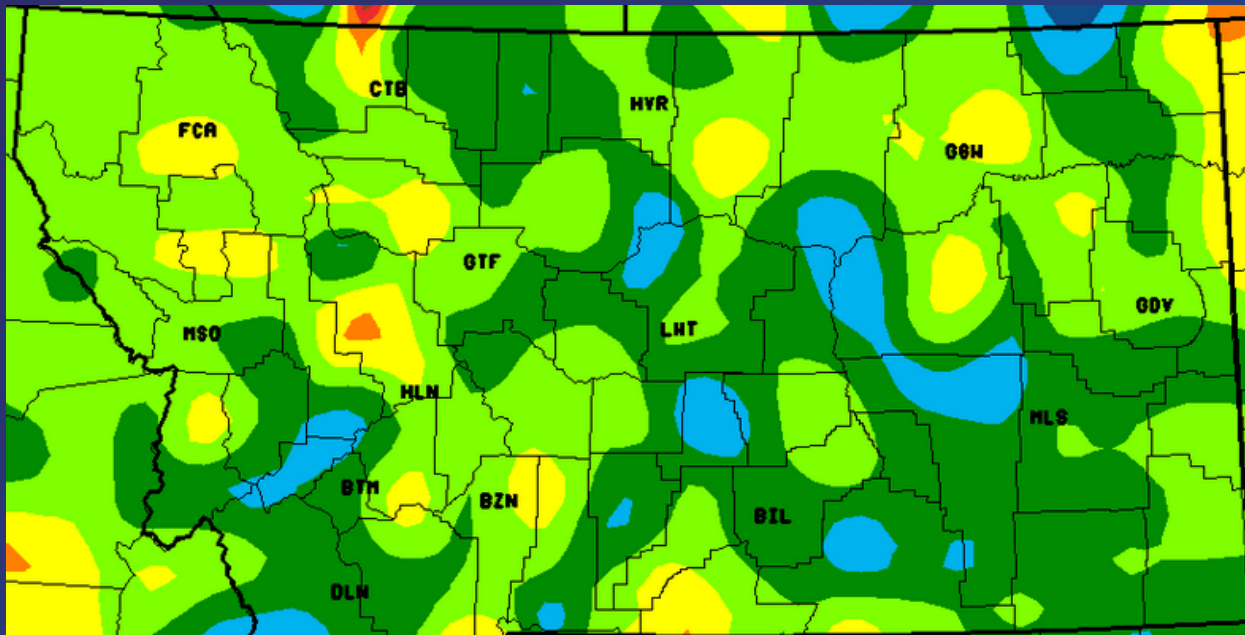
- Dry most of March
- Large storm last half of last week
  - *Significant snowfall over southeast*
- Still large areas below to well below normal
  - *Front range and adjacent plains*
  - *Extreme southwest*



February 2007

# Percent of Normal Precipitation

## Water Year 2007



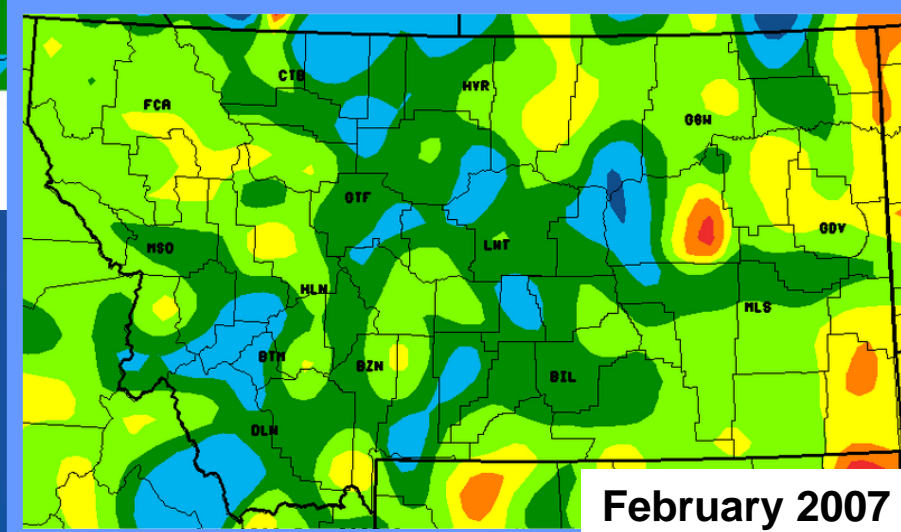
Oct 2006-Mar 2007 Percent of Normal Precipitation  
Period of Normal: 1971-2000

20 40 60 85 115 150 200

October 2006 – March 2007

Most of Montana averaging at least near normal

- *Central... southwest and southeast above to well above normal*
- *Southeast improved over status through February*

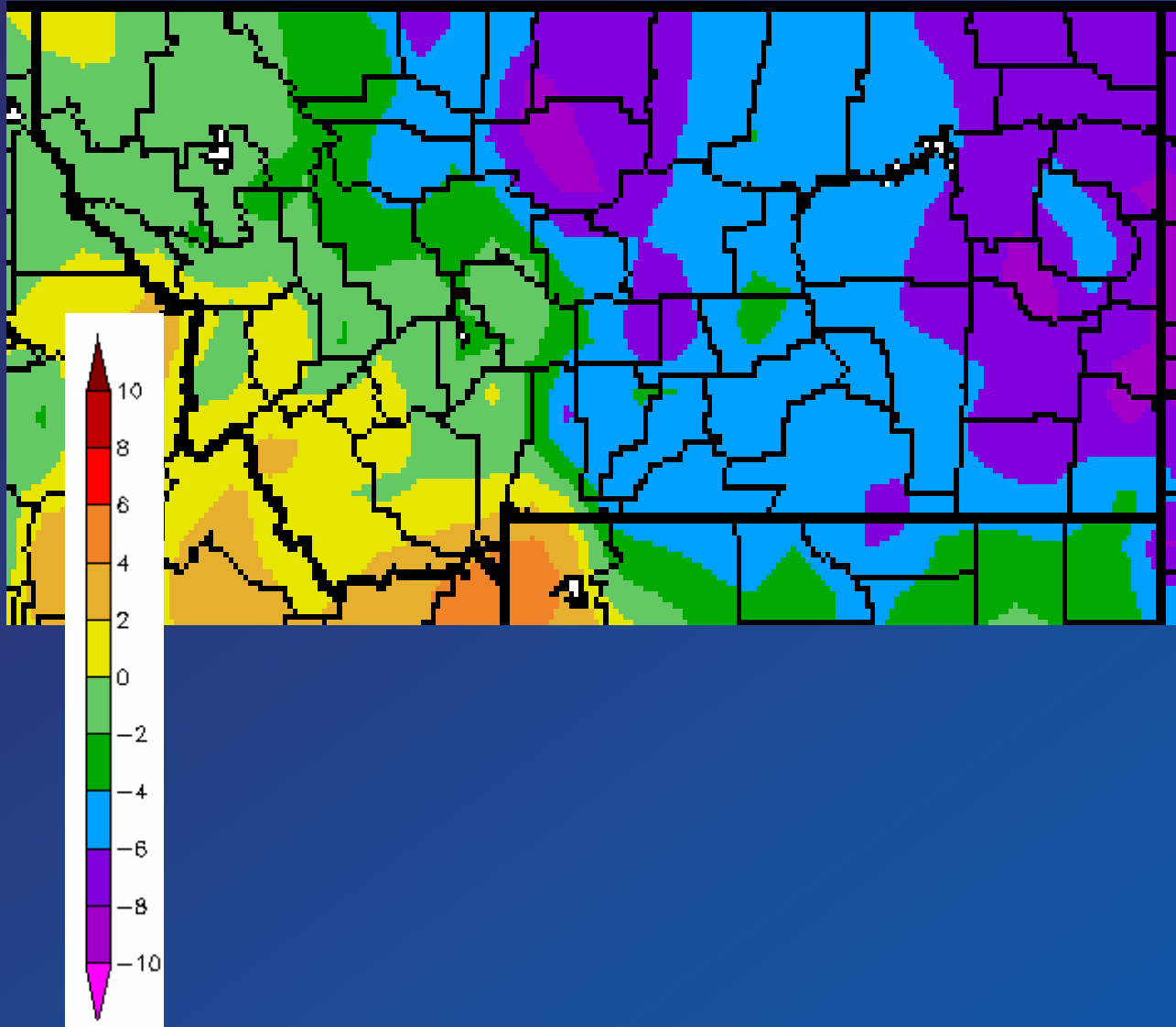


February 2007



# Departure from Average Temperature

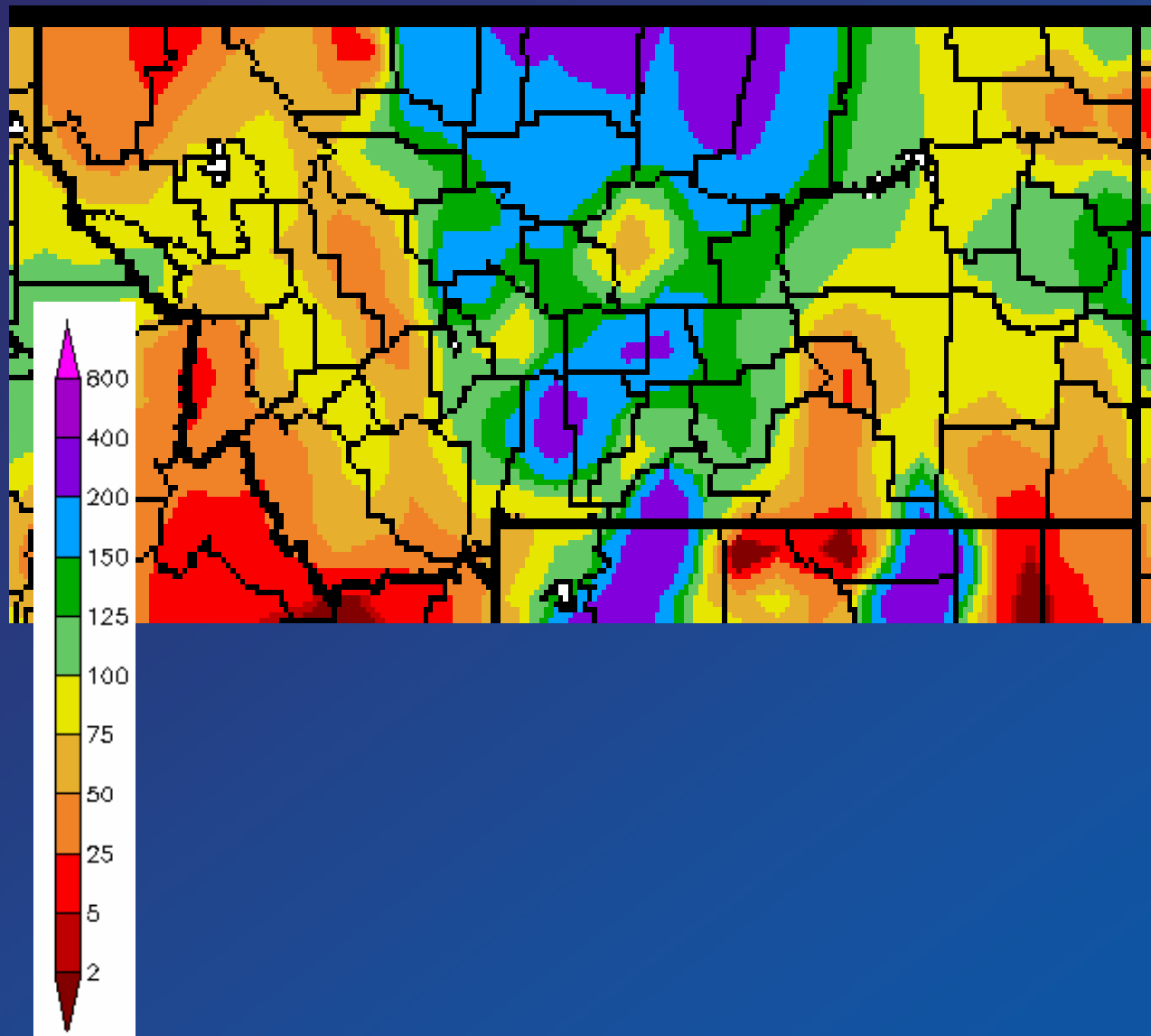
April 1 – April 17, 2006



- 💧 **Cool overall**
- 💧 **West – Near normal**
- 💧 **East – 4 to 8 degrees below normal**

# Percent of Average Precipitation

April 1 – April 17, 2006



- West of divide – Generally below to well below normal
  - *Valleys nearer to normal*
- Central – Above to well above normal
  - *Pockets with more than 200% of normal!*
- Northeast – Generally near normal
- Southeast – Below to well below normal

# Precipitation Totals

## April and Water Year 2007

|                          | APRIL 1 - 30   |              |             |              | WATER YEAR TO DATE |              |             |              |
|--------------------------|----------------|--------------|-------------|--------------|--------------------|--------------|-------------|--------------|
|                          | ACTUAL<br>PCPN | NRML<br>PCPN | +/-<br>NRML | % OF<br>NRML | ACTUAL<br>PCPN     | NRML<br>PCPN | +/-<br>NRML | % OF<br>NRML |
| <b>WESTERN MONTANA</b>   |                |              |             |              |                    |              |             |              |
| BUTTE                    | 1.18           | 1.02         | 0.16        | 116          | 5.11               | 4.77         | 0.34        | 107          |
| KALISPELL                | 0.89           | 1.22         | -0.33       | 73           | 6.84               | 9.01         | -2.17       | 76           |
| MISSOULA                 | 0.81           | 0.94         | -0.13       | 86           | 6.72               | 5.57         | 1.15        | 121          |
| MULLAN PASS              | 1.58           | 2.61         | -1.03       | 61           | 38.63              | 34.91        | 3.72        | 111          |
| <b>SOUTHWEST MONTANA</b> |                |              |             |              |                    |              |             |              |
| BIG SKY                  | 2.43           | 1.11         | 1.32        | 219          | 11.31              | 9.92         | 1.39        | 114          |
| BOULDER                  | 0.45           | 0.76         | -0.31       | 59           | 3.57               | 3.58         | -0.01       | 100          |
| BELGRADE FIELD           | 1.87           | 1.40         | 0.47        | 134          | 6.70               | 6.05         | 0.65        | 111          |
| BOZEMAN MSU              | 2.94           | 2.06         | 0.88        | 143          | 13.38              | 8.50         | 4.88        | 157          |
| DILLON AIRPORT           | 1.14           | 0.95         | 0.19        | 120          | 4.61               | 3.17         | 1.44        | 145          |
| DIVIDE                   | 1.03           | 0.00         | 1.03        | 0            | 3.71               | 0.00         | 3.71        | 0            |
| ENNIS                    | 1.37           | 1.30         | 0.07        | 105          | 6.77               | 5.19         | 1.58        | 130          |
| HELENA                   | 0.82           | 0.91         | -0.09       | 90           | 3.93               | 4.02         | -0.09       | 98           |
| ROGERS PASS 9 NNE        | 2.21           | 1.57         | 0.64        | 141          | 6.88               | 6.75         | 0.13        | 102          |
| TOWNSEND                 | 0.83           | 0.71         | 0.12        | 117          | 3.72               | 3.23         | 0.49        | 115          |
| W YELLOWSTONE            | 0.34           | 1.51         | -1.17       | 23           | 6.85               | 12.67        | -5.82       | 54           |
| WISDOM                   | 0.88           | 0.98         | -0.10       | 90           | 5.26               | 5.03         | 0.23        | 105          |

# Precipitation Totals

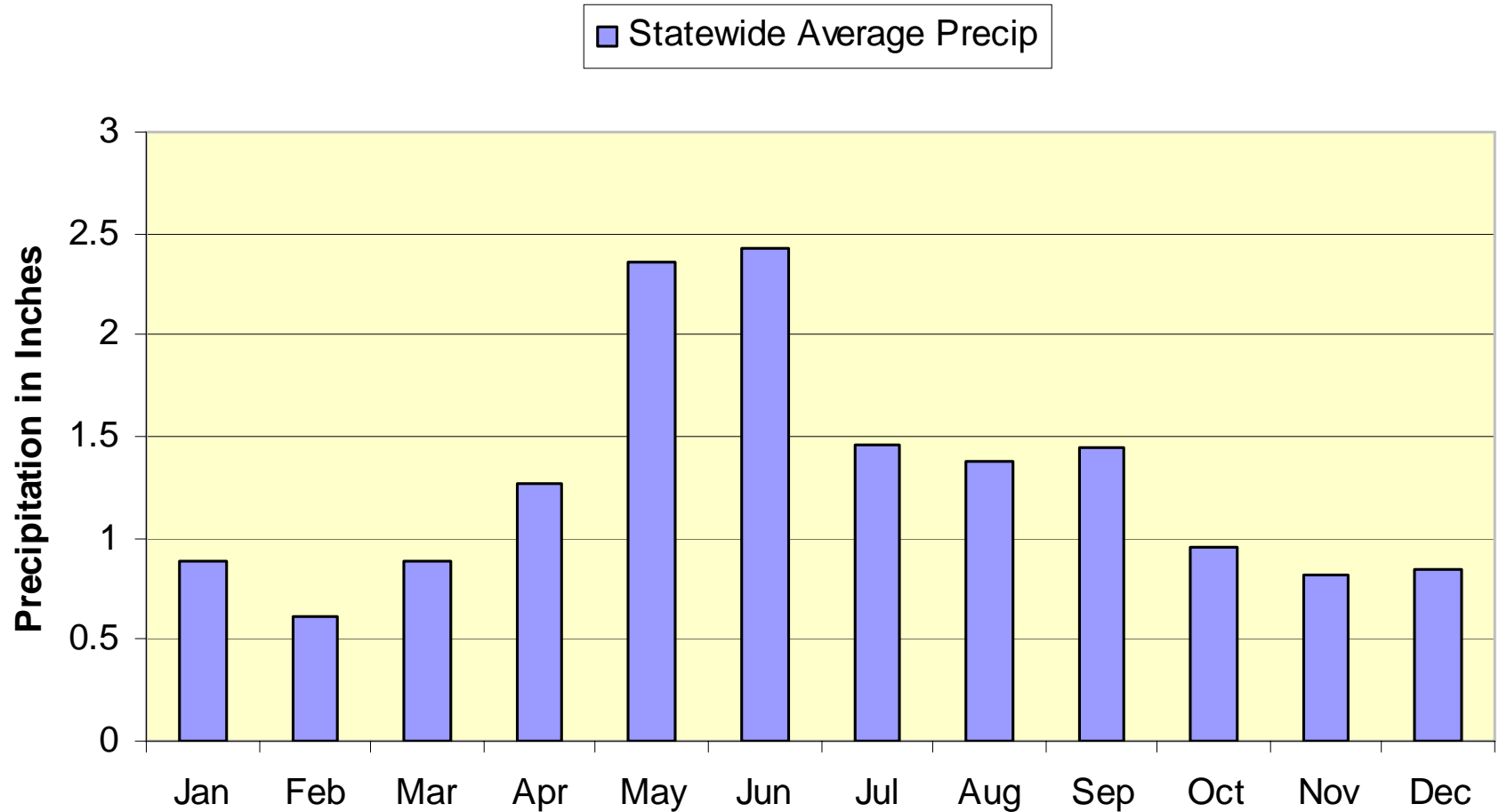
## April and Water Year 2007

|                        | APRIL 1 - 30   |              |             |              | WATER YEAR TO DATE |              |             |              |
|------------------------|----------------|--------------|-------------|--------------|--------------------|--------------|-------------|--------------|
|                        | ACTUAL<br>PCPN | NRML<br>PCPN | +/-<br>NRML | % OF<br>NRML | ACTUAL<br>PCPN     | NRML<br>PCPN | +/-<br>NRML | % OF<br>NRML |
| <b>CENTRAL MONTANA</b> |                |              |             |              |                    |              |             |              |
| BILLINGS               | 2.34           | 1.76         | 0.58        | 133          | 8.20               | 6.88         | 1.32        | 119          |
| CASCADE 20 SSE         | 1.94           | 1.19         | 0.75        | 163          | 5.94               | 4.70         | 1.24        | 126          |
| CHESTER                | 1.84           | 0.71         | 1.13        | 259          | 5.76               | 3.11         | 2.65        | 185          |
| CHOTEAU                | 1.75           | 0.72         | 1.03        | 243          | 3.47               | 2.78         | 0.69        | 125          |
| CONRAD                 | 0.04           | 1.04         | -1.00       | 4            | 1.59               | 3.98         | -2.39       | 40           |
| FORT ASSINNIBOINE      | 1.58           | 0.99         | 0.59        | 160          | 5.03               | 4.22         | 0.81        | 119          |
| FORT BENTON            | 2.03           | 1.21         | 0.82        | 168          | 6.21               | 4.86         | 1.35        | 128          |
| GOLD BUTTE 7 N         | 2.28           | 1.10         | 1.18        | 207          | 6.49               | 4.22         | 2.27        | 154          |
| GRASS RANGE            | 2.00           | 1.44         | 0.56        | 139          | 7.41               | 5.70         | 1.71        | 130          |
| GREAT FALLS            | 2.33           | 1.41         | 0.92        | 165          | 6.90               | 5.82         | 1.08        | 119          |
| HAVRE                  | 2.13           | 0.87         | 1.26        | 245          | 5.56               | 3.98         | 1.58        | 140          |
| LIVINGSTON             | 2.83           | 1.58         | 1.25        | 179          | 8.90               | 6.05         | 2.85        | 147          |
| LEWISTOWN              | 1.59           | 1.38         | 0.21        | 115          | 6.86               | 6.63         | 0.23        | 103          |
| MARTINSDALE 3 NNW      | 1.03           | 1.20         | -0.17       | 86           | 4.71               | 4.51         | 0.20        | 104          |
| NEIHART 8 NNW          | 1.95           | 1.84         | 0.11        | 106          | 11.15              | 8.21         | 2.94        | 136          |
| STANFORD               | 1.47           | 1.54         | -0.07       | 95           | 6.17               | 5.98         | 0.19        | 103          |
| VALIER                 | 1.84           | 0.92         | 0.92        | 200          | 3.73               | 3.31         | 0.42        | 113          |
| WHITE SULPHUR SPRGS    | 0.97           | 1.18         | -0.21       | 82           | 3.58               | 4.77         | -1.19       | 75           |
| <b>EASTERN MONTANA</b> |                |              |             |              |                    |              |             |              |
| GLASGOW                | 0.89           | 0.75         | 0.14        | 119          | 3.41               | 3.32         | 0.09        | 103          |
| MILES CITY             | 1.35           | 1.40         | -0.05       | 96           | 4.15               | 4.90         | -0.75       | 85           |

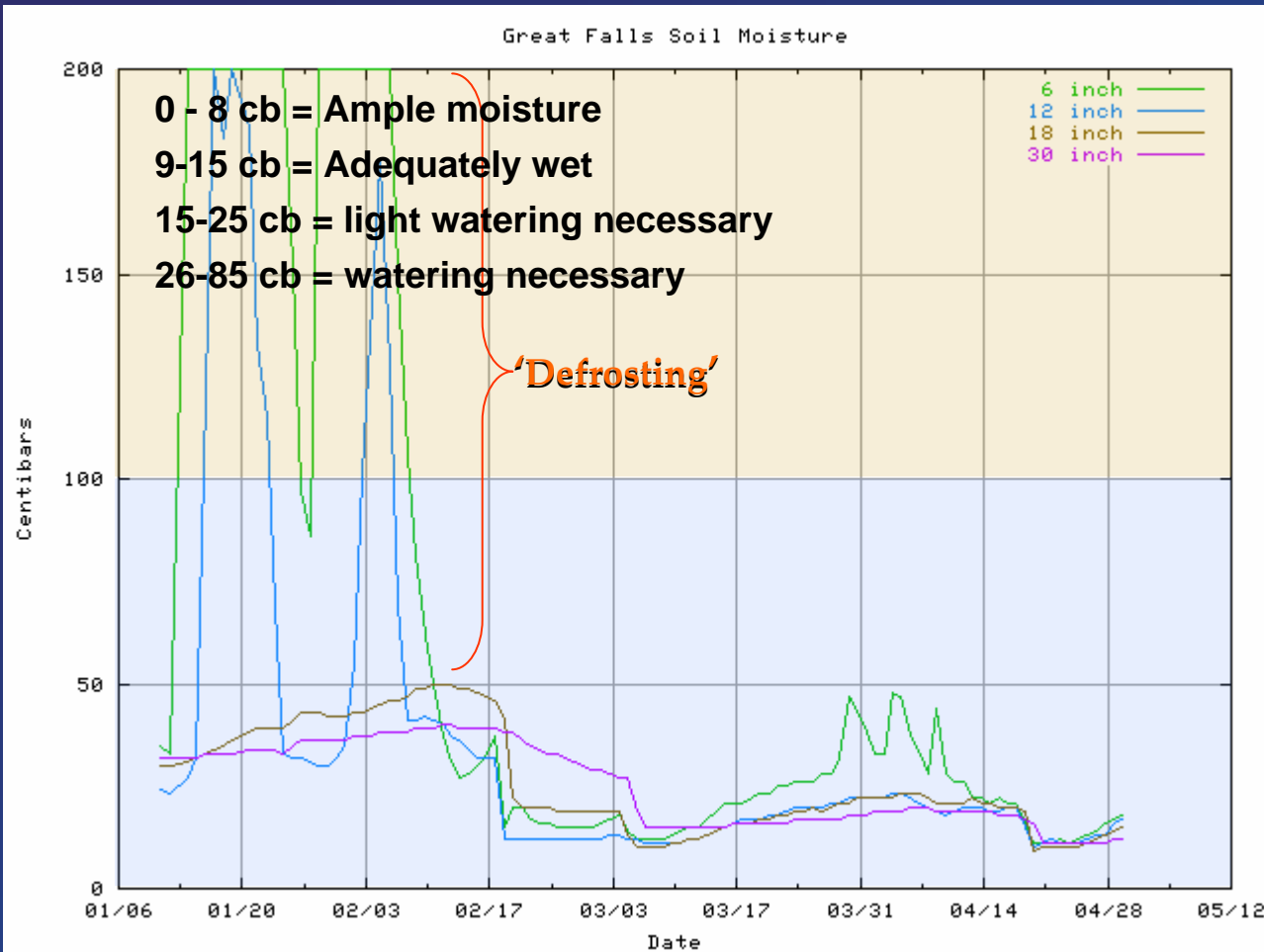


# Statewide Average Precipitation

## April a mix of winter and summer type precipitation



# Great Falls Soil Moisture

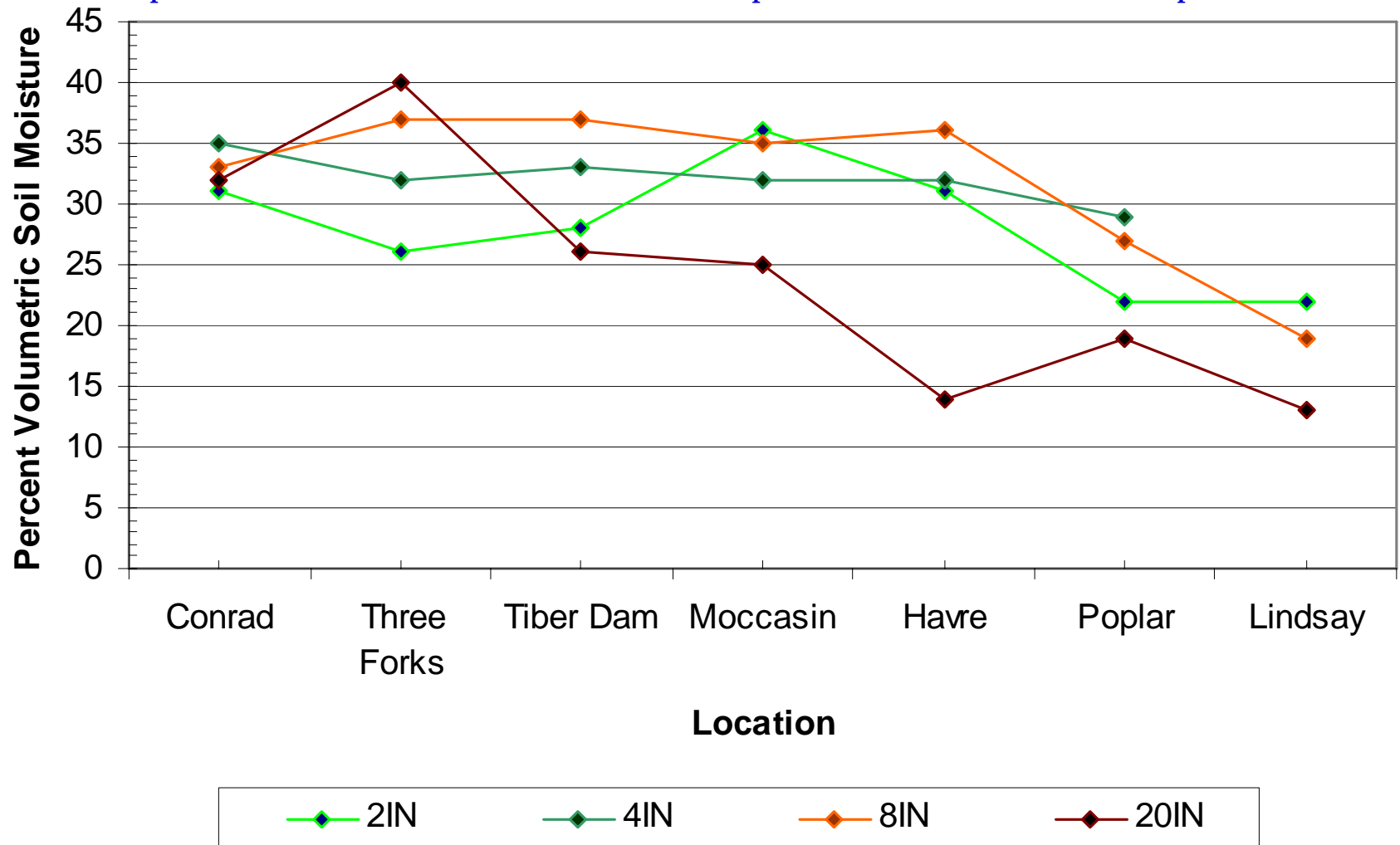


💧 All levels  
moist  
– 15 to 25 cb

# Expanding Soil Moisture Network

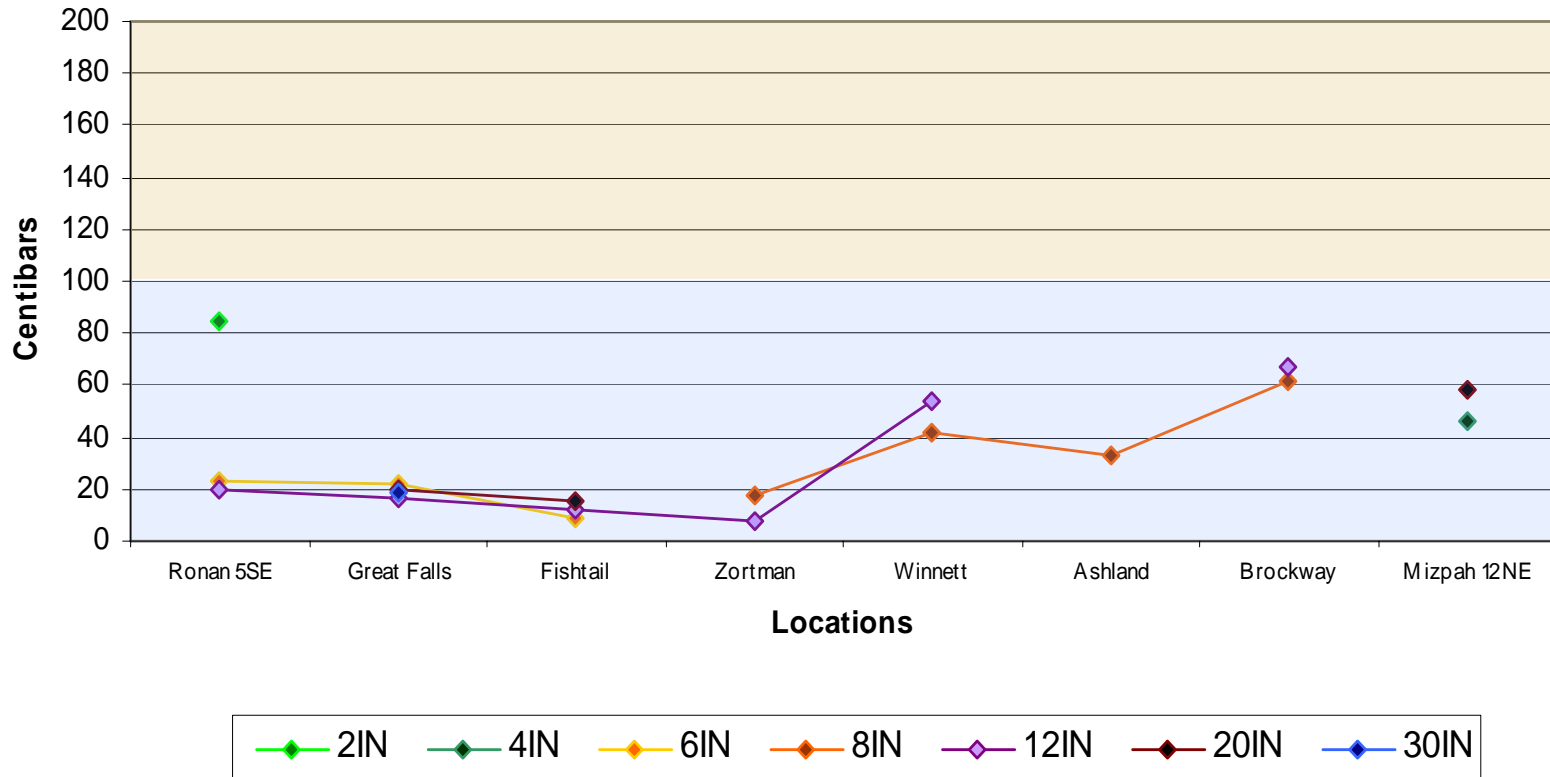
## Volumetric Soil Moisture in Percent at Depths

Field capacity of silt loam and clay loam soils is 35 percent of volumetric soil moisture. The plant available water of these soils is available to plants at values between 13 and 40 percent.



# Expanding Soil Moisture Network

Soil Moisture in Centibars at Depths



Conversion of centibars to available water in loam and clay/loam soils...

10cb or less...More than 95 percent plant available water

10-30cb.....75 - 95 percent plant available water

30-50cb.....55 - 75 percent plant available water

50-70cb.....45 - 55 percent plant available water

80-85cb.....38 - 40 percent plant available water

85cb or more...No available water

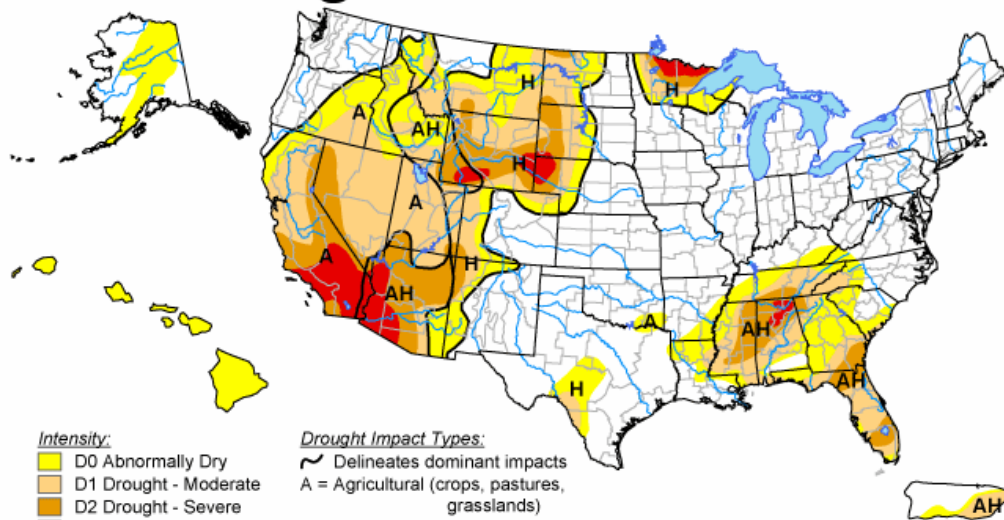


# National Drought Monitor

Issued April 17, 2007

## U.S. Drought Monitor

April 17, 2007  
Valid 8 a.m. EDT



### Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

### Drought Impact Types:

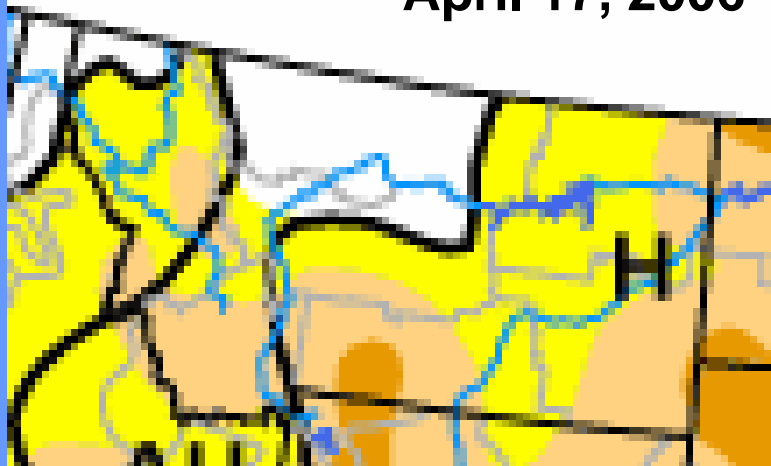
- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

The Drought Monitor  
Local conditions may  
for forecast statements

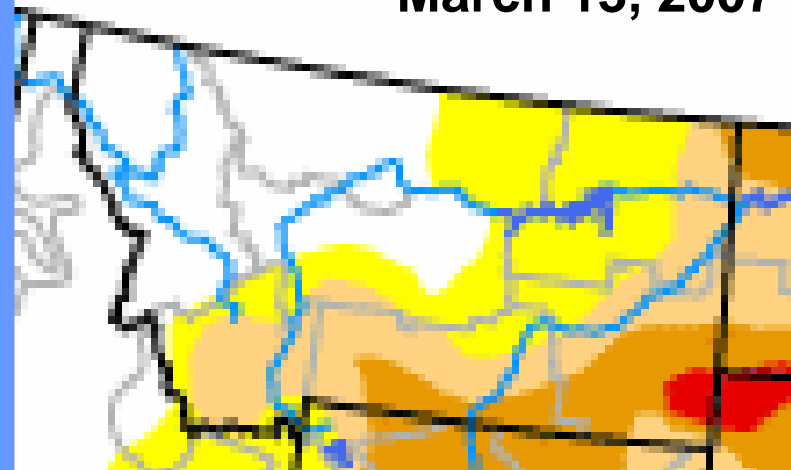
<http://www.drought.gov>

- Western...southern and eastern Montana showing Moderate (D1) to Severe Drought (D2)
- Isolated area of Extreme (D3) in southeast removed
- Abnormally Dry (D0) and Moderate Drought (D1) introduced west of divide

April 17, 2006



March 13, 2007

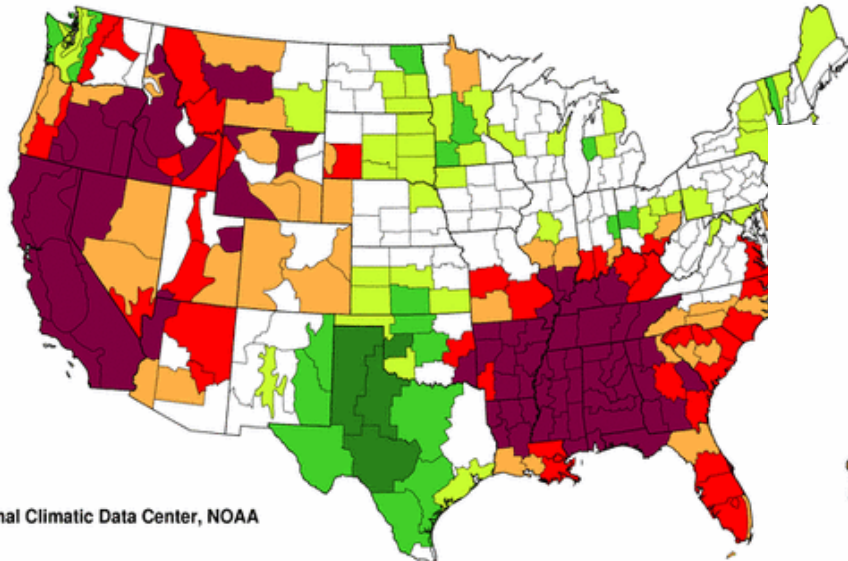


# Palmer Hydrological Drought Index

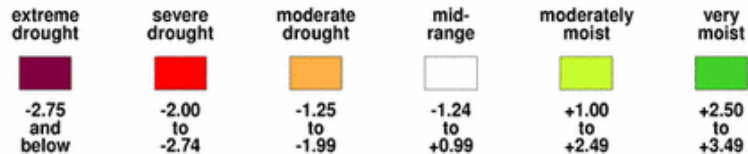
## March 2007

Palmer Z Index  
Short-Term Conditions

March 2007



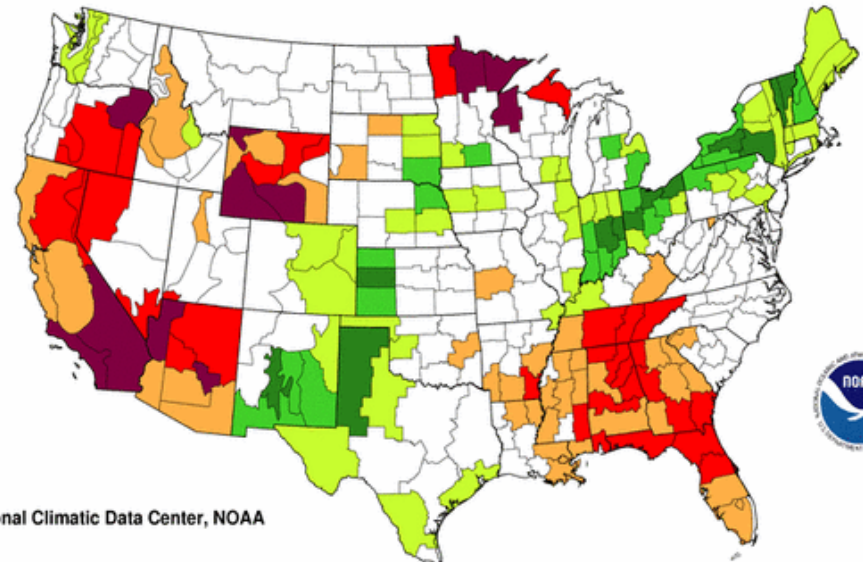
National Climatic Data Center, NOAA



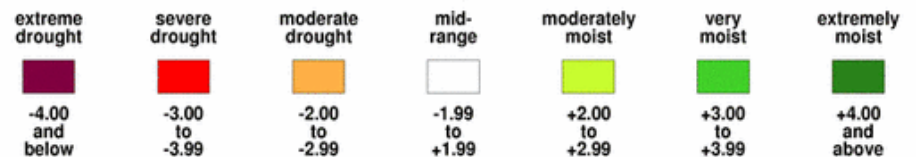
💧 No Montana climate divisions classified as either 'moist' or 'drought' for long-term conditions

Palmer Hydrological Drought Index  
Long-Term (Hydrological) Conditions

March 2007

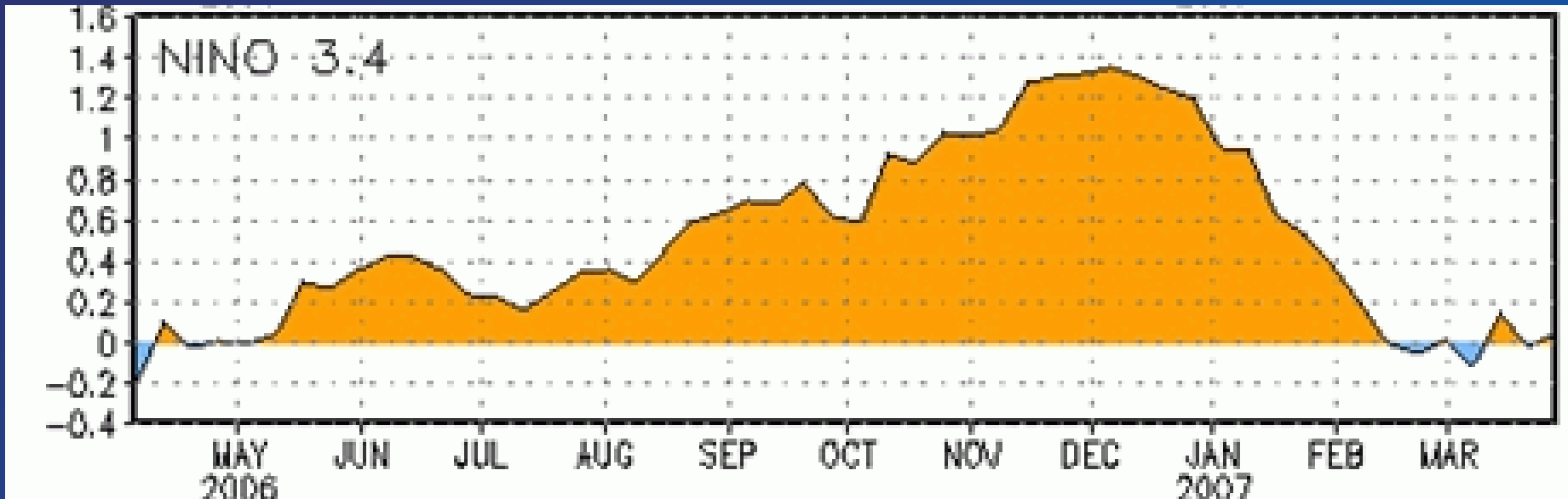


National Climatic Data Center, NOAA



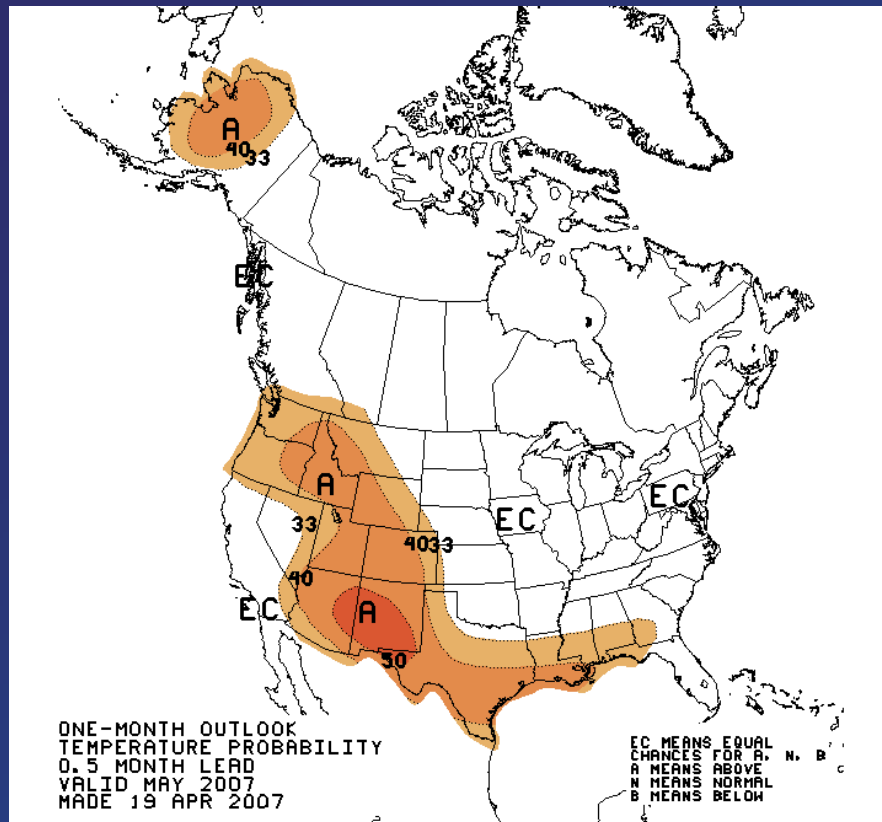
# El Niño / La Niña

- El Niño conditions (above normal sea surface temperatures) dominated during autumn and early winter
- El Niño conditions disappeared from eastern Pacific during February... currently in neutral phase
- Transition from neutral to La Niña conditions (below normal sea surface temperatures) possible during next 2-3 months



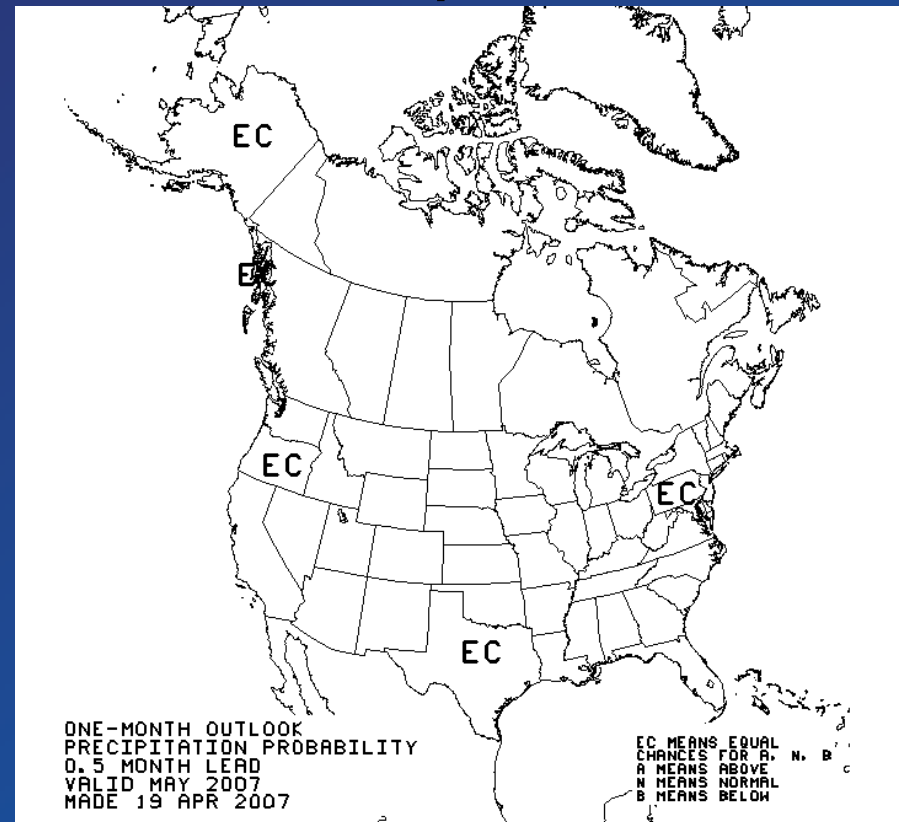
# May Outlook

## Temperature



- Better chances temperatures will be above normal over west and central Montana
  - 33% to 50% chance
- Remainder of area shows no forecast skill...
  - *Equal chances temperatures will be above... below or near normal*

## Precipitation

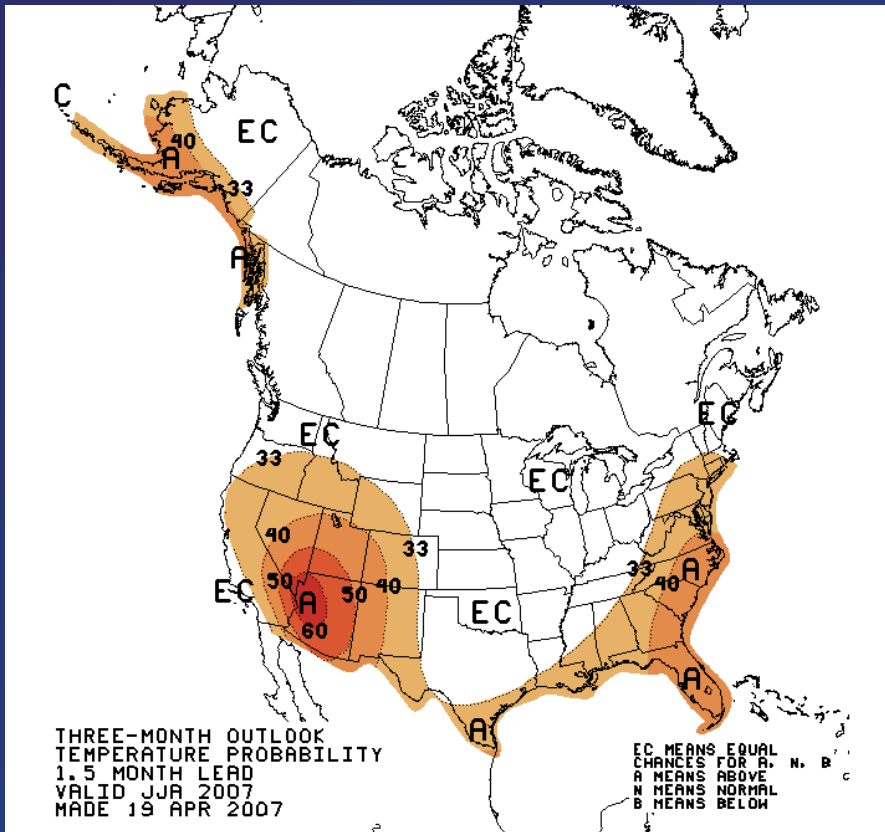


- No forecast skill across all of Montana...
  - *Equal chances precipitation will be above... below or near normal*



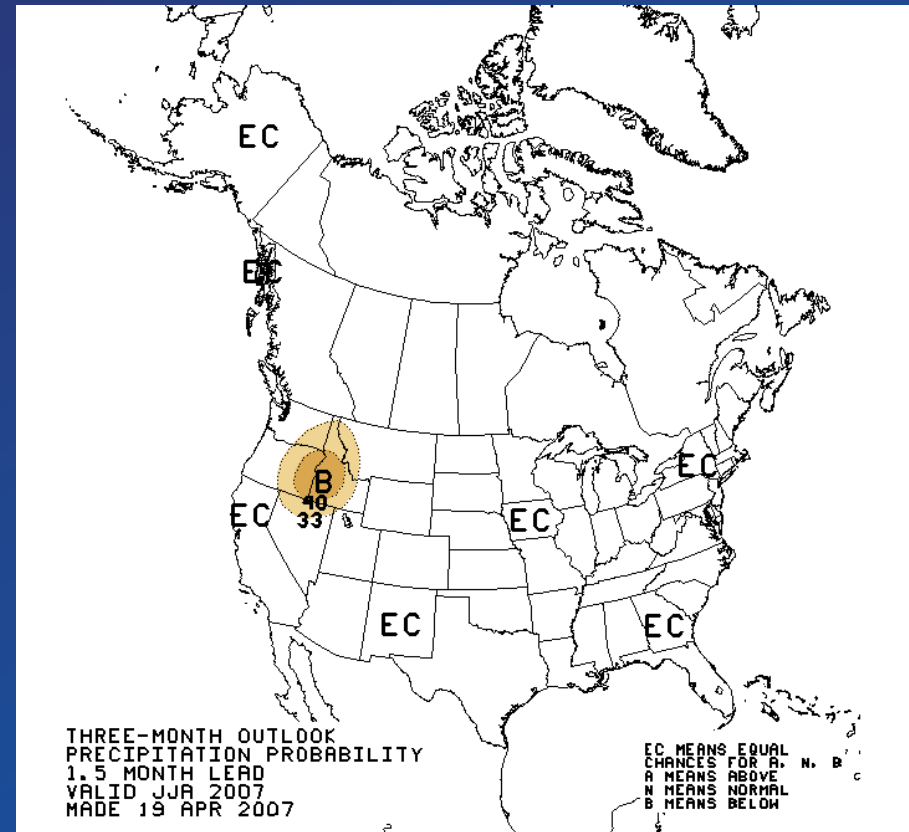
# June – August Outlook

## Temperature



- Most of Montana... no forecast skill...
  - Equal chances temperatures will be above... below or near normal
- Extreme southwest - 33% to 40% chance for above normal temperatures

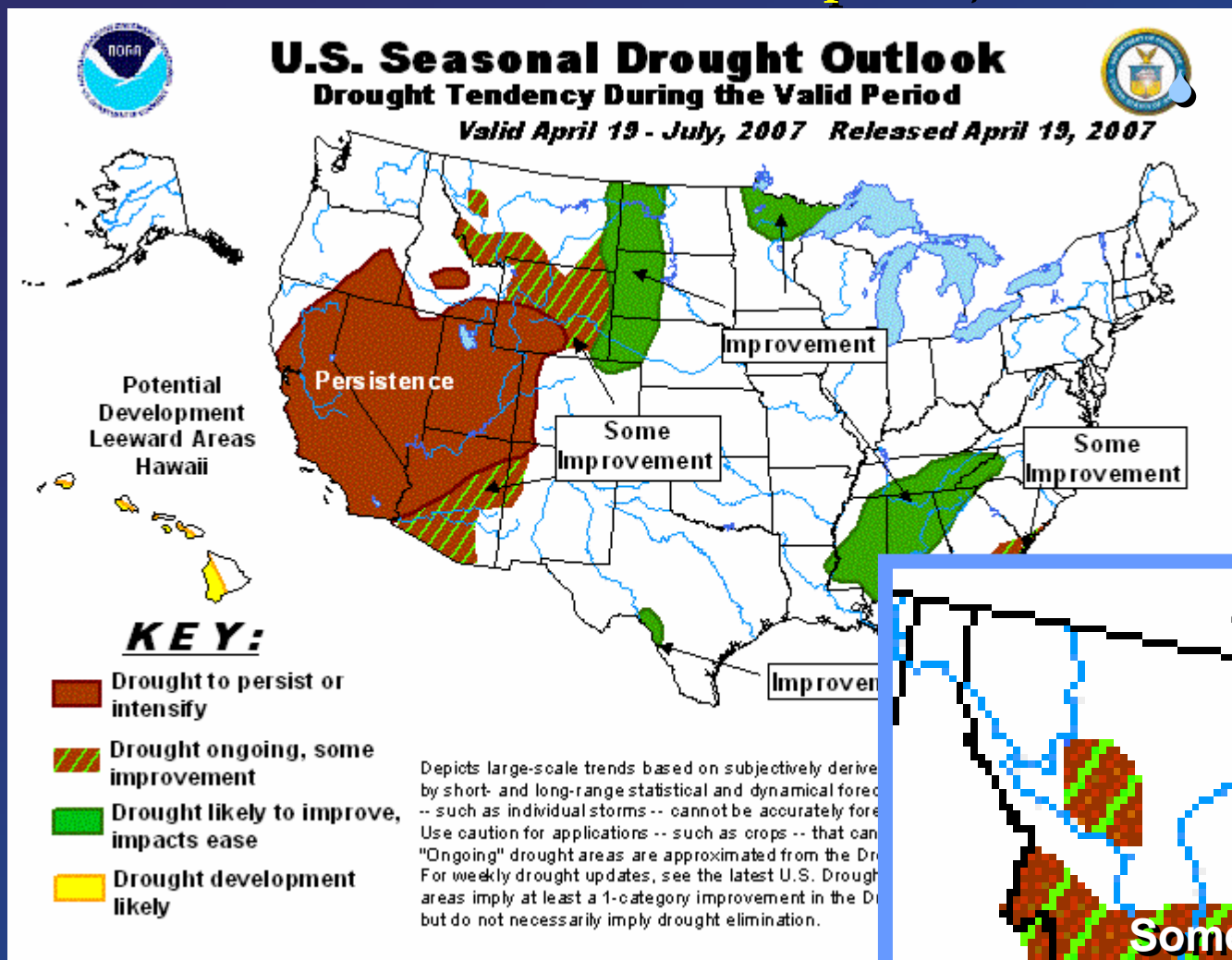
## Precipitation



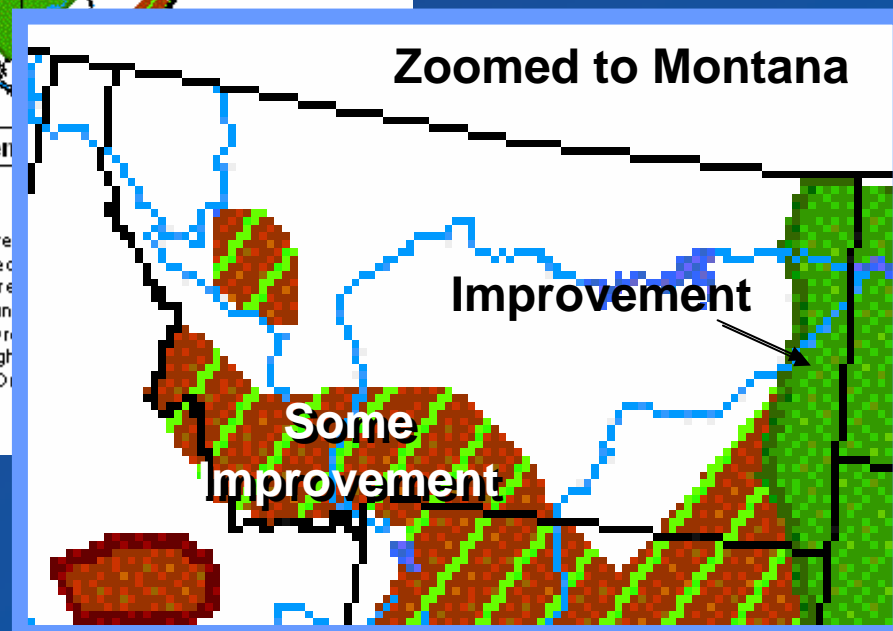
- Most of Montana... no forecast skill...
  - Equal chances precipitation will be above... below or near normal
- Extreme west - 33% to 40% chance for above normal precipitation

# Drought Outlook through June

Issued April 19, 2007



Areas in drought status expected to improve some through the spring



# To sum up...

- 💧 **Wet February was followed by a dry March**
  - *Strong storm hit southeast Montana last half of last week of month bringing their water year totals from below to well below normal to above normal*
- 💧 **April dry so far for much of the state**
  - *Northcentral has received some precipitation*
- 💧 **No significant precipitation trends in the forecast**
  - *Both the May and June-August outlooks show no forecast skill with equal chances for above... below or near normal precipitation for most of the state*

**weather.gov**

**weather.gov/billings**

**weather.gov/glasgow**

**weather.gov/missoula**

**weather.gov/greatfalls**